

STATISTICS AND PROBABILITY Points to Remember

- Range = $L - S$ (L - Largest value, S - Smallest value)
- Coefficient of range = $\frac{L - S}{L + S}$; Variance $\sigma^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}$
- Standard deviation $\sigma = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n}}$
- Standard deviation (ungrouped data)
 - (i) Direct method $\sigma = \sqrt{\frac{\sum x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2}$
 - (ii) Mean method $\sigma = \sqrt{\frac{\sum d_i^2}{n}}$
 - (iii) Assumed mean method $\sigma = \sqrt{\frac{\sum d_i^2}{n} - \left(\frac{\sum d_i}{n}\right)^2}$
 - (iv) Step deviation method $\sigma = c \times \sqrt{\frac{\sum d_i^2}{n} - \left(\frac{\sum d_i}{n}\right)^2}$
- Standard deviation of first n natural numbers $\sigma = \sqrt{\frac{n^2 - 1}{12}}$
- Standard deviation (grouped data)
 - (i) Mean method $\sigma = \sqrt{\frac{\sum f_i d_i^2}{N}}$
 - (ii) Assumed mean method $\sigma = \sqrt{\frac{\sum f_i d_i^2}{N} - \left(\frac{\sum f_i d_i}{N}\right)^2}$
 - (iii) Step deviation method $\sigma = C \times \sqrt{\frac{\sum f_i d_i^2}{N} - \left(\frac{\sum f_i d_i}{N}\right)^2}$
- Coefficient of variation $C.V = \frac{\sigma}{\bar{x}} \times 100\%$
- If the C.V. value is less, then the observations of corresponding data are consistent. If the C.V. value is more then the observations of corresponding are inconsistent.
- In a random experiment, the set of all outcomes are known but exact outcome is not known.
- The set of all possible outcomes is called sample space.
- A, B are said to be mutually exclusive events if $A \cap B = \phi$
- Probability of event E is $P(E) = \frac{n(E)}{n(S)}$
 - (i) The probability of sure event is 1 and the probability of impossible event is 0.
 - (ii) $0 \leq P(E) \leq 1$; (iii) $P(\bar{E}) = 1 - P(E)$
- If A and B are mutually exclusive events then $P(A \cup B) = P(A) + P(B)$.
- (i) $P(A \cap \bar{B}) = P(\text{only } A) = P(A) - P(A \cap B)$
- (ii) $P(\bar{A} \cap B) = P(\text{only } B) = P(B) - P(A \cap B)$
- $P(A \cup B) = P(A) + P(B) - P(A \cap B)$, for any two events A, B .
- For any three events A, B, C

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(B \cap C) - P(C \cap A) + P(A \cap B \cap C)$$